Wadeable Streams Assessment: A Collaborative Survey of the Nation's Streams EPA 841-B-06-002

Executive Summary and Introduction

May 2006

Executive Summary

> *"I started out thinking of America as highways and state lines. As I got to know it better, I began to think of it as rivers. America is a great story, and there is a river on every page of it."*

This quote by well-known American journalist Charles Kuralt reflects on the central role rivers and streams have played in shaping the history and character of our nation. Because families and communities are dependent on these waterbodies for their health and survival, the condition of these waterbodies, as well as how we protect them, reflects our values and choices as a society.

This Wadeable Streams Assessment (WSA) provides the first statistically defensible summary of the condition of the nation's streams and small rivers, which are so integrally tied to our history. This report brings the results of this ground-breaking study to the American public.

In the 35 years since the passage of the Clean Water Act (CWA), the U.S. Congress, the American public, and other interested parties have asked the U.S. Environmental Protection Agency (EPA) to describe the water quality condition of U.S. waterbodies. These requests have included seemingly simple questions: Is there a water quality problem? How extensive is the problem? Is the problem widespread or does it occur in "hotspots"? Which environmental stressors affect the quality of the nation's streams and rivers, and which are most likely to be detrimental? This WSA presents the initial results of what will be a long-term partnership between EPA, the states, tribes, and other federal agencies to answer these questions.

This assessment encompasses the wadeable streams and rivers that account for a vast majority of the length of flowing waters in the United States. To perform this assessment, EPA, the states, and tribes collected chemical, physical, and biological data at more 1,392 wadeable perennial stream locations to determine the biological condition of these waters and the most important factors affecting their water quality. Teams collected samples at sites chosen using an innovative statistical design to ensure representative results. The results of this analysis provide a clear assessment of the biological quality of wadeable, perennial streams and rivers across the country, within each of three major climatic and landform regions, and nine ecological regions.

The information provided in this report fills an important gap in meeting the requirements of the CWA. The purpose of this assessment is fourfold:

- Report on the ecological condition of all wadeable, perennial streams and rivers within the conterminous United States. (Pilot projects are underway in Alaska and Hawaii.)
- Describe the biological condition of these systems using direct measures of aquatic life. Assessments of stream quality have historically relied primarily on chemical analyses of water, or sometimes on the status of game fish.
- Identify and rank the relative importance of chemical and physical stressors (disturbances) affecting stream and river condition.

- Enhance state and tribal capacity to include these design and measurement tools in their water quality monitoring programs so that future assessments will be ecologically and statistically comparable, both regionally and nationally.

The results of this survey show that 42% of the U.S. stream miles are in poor condition compared to best available reference sites in their ecological regions, 25% are in fair condition, and 28% are in good condition (Figure ES-1). Five percent of U.S. stream miles were not assessed.

Three major regions were outlined for this assessment: the Eastern Highlands, the Plains and Lowlands, and the West. Of these three regions, the West is in the best condition, with 45% of the length of wadeable flowing waters in good condition. The Eastern Highlands region presents the most concerns, with only 18% of the length of wadeable streams and rivers in good condition, and 52% of its length of wadeable streams and rivers in poor condition. In the Plains and Lowlands region, water quality conditions are between the other two regions, with almost 30% of the length of wadeable streams and rivers in good condition and 40% in poor condition.

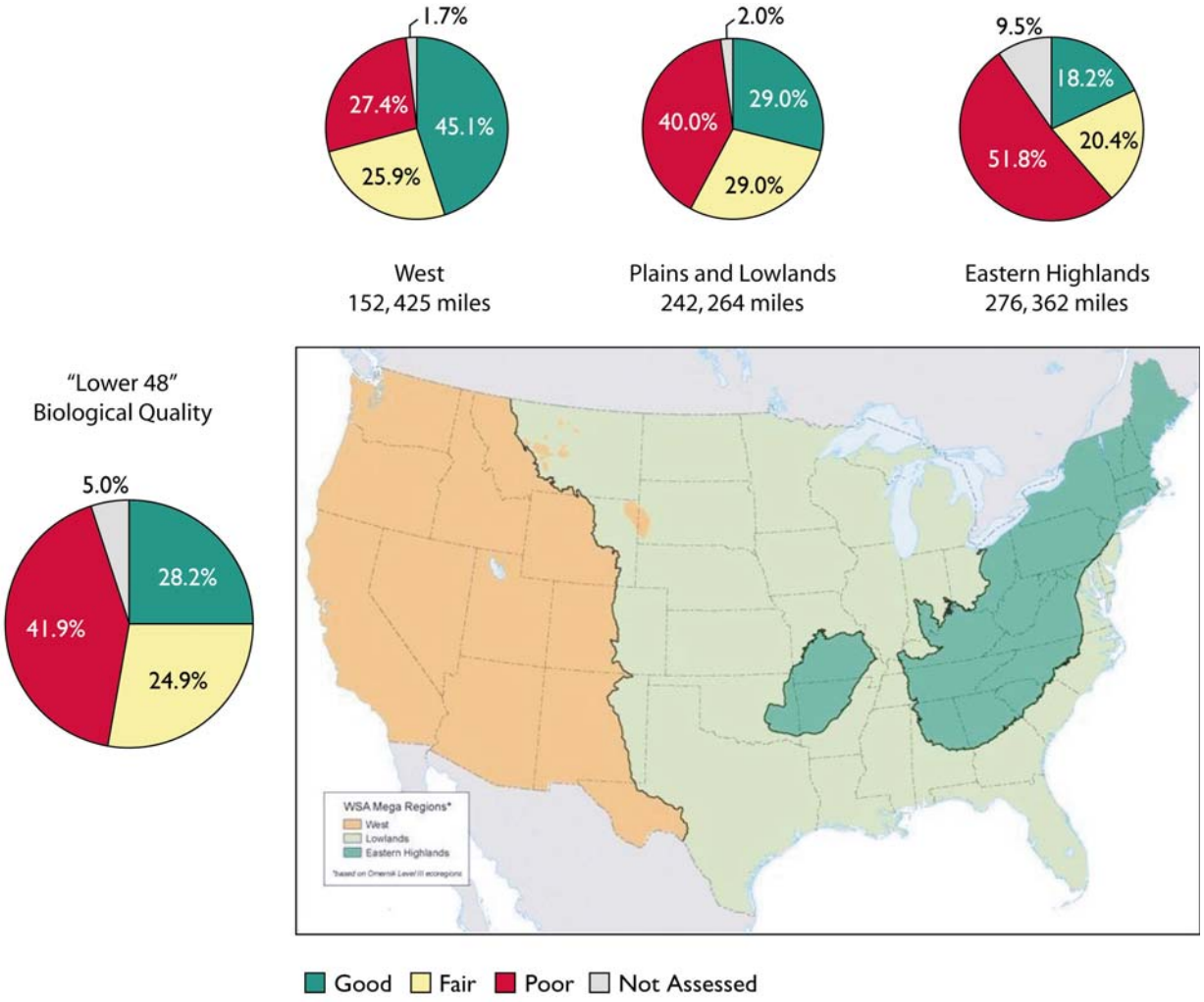

Figure ES-1. Condition of wadeable streams.

The WSA also examines the key factors most likely responsible for diminishing biological quality in flowing waters, as determined by aquatic macroinvertebrate communities. The most widespread stressors observed across the country and in each of the three major regions are nitrogen, phosphorus, riparian disturbance, and streambed sediments. Increases in nutrients (e.g., nitrogen and phosphorus) and streambed sediments have the highest impact on biological condition; streams scoring poor for these stressors were at 2 to 3 times higher risk of having poor biological condition than streams that scored in the good range for the same stressors. (Figure ES-2).

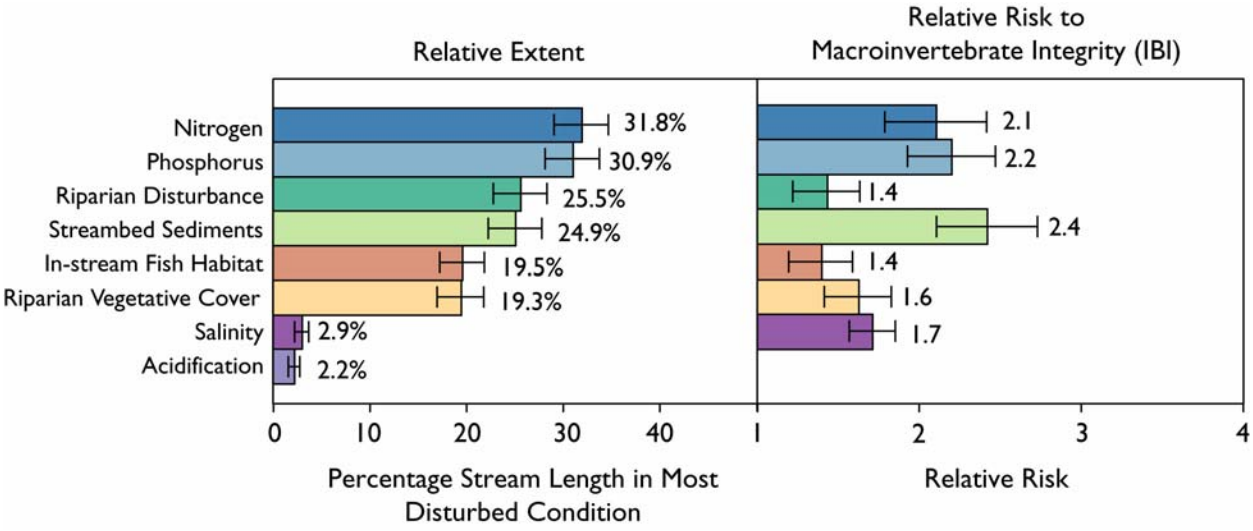

Figure ES-2. Relative extent and relative risk for anthropogenic stressors impacting the nation's waters.

Understanding the current condition of the nation's wadeable streams and rivers is critical in supporting the development of water quality management plans and priorities that help maintain and restore the ecological condition of these resources. This report provides a primary baseline assessment to track water quality status and trends. The results of this WSA, and others like it in the future, will inform the public, water quality managers, and elected officials of the effectiveness of programs to protect and restore water quality and the potential need to refocus these efforts.

Readers who wish to learn more about the technical background of this assessment are directed to literature cited in the References section and to the appendix located at the end of this report.

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Introduction

In 1972, Congress enacted the landmark Clean Water Act (CWA) to protect our nation's vital water resources. A critical section of the CWA calls for periodic accounting to Congress and the American public on the success or failure of efforts to protect and restore the nation's waterbodies. In recent years, a number of groups have reviewed the available data and concluded that we were unable to provide Congress and the public with adequate information regarding the condition of the nation's waterbodies.

The General Accounting Office in 2000 issued a report noting that EPA and the states cannot make statistically valid inferences about water quality and lack data to support management decisions. In 2001, a National Research Council report found that a uniform, consistent approach to ambient monitoring and data collection was necessary to support core water programs. In 2002, the National Academy of Public Administration and the H. John Heinz III Center for Science, Economics, and the Environment issued similar conclusions.

Following the 2002 release of the Heinz Center's *The State of the Nation's Ecosystems,* the national newspaper *USA Today* published an editorial discussing the lack of environmental information available to the public. This editorial emphasized that agencies have failed to fund the collection of necessary environmental data despite very effective collection of comparable information on the nation's economy, population, energy usage, human health, and crime. The editorial concluded that "without such information, the public doesn't know when to celebrate environmental successes, tackle new threats, or end efforts that throw money down a drain" (USA Today, September 21, 2002).

To bridge this information gap, the U.S. Environmental Protection Agency (EPA), the states, tribes, and other federal agencies are collaborating on a new monitoring effort to produce assessments that provide the public with improved water quality information on the nation's waterbodies. This collaboration has produced reports on three national water quality assessments during the past 5 years for coastal and estuarine waters (see Highlight), with similar collaboration planned for other water resource assessments. This Wadeable Streams Assessment (WSA)—the first nationally consistent, statistically valid study of the nation's wadeable streams—marks the continuation of a commitment to produce statistically valid scientific assessments of the nation's fresh waters.

Highlight: National Reports on Coastal Waters

The National Coastal Assessment surveys the condition of the nation's coastal resources, as well as state efforts to protect, manage, and restore coastal ecosystems. The results of these surveys are compiled periodically into a *National Coastal Condition Report* (NCCR). The states, EPA, and partner agencies—the National Oceanic and Atmospheric Administration (NOAA), U.S. Geological Survey (USGS), and the U.S. Fish and Wildlife Service (FWS)—issued the *National Coastal Condition Report II* in January 2005 as the second in this series of environmental surveys of U.S. coastal waters. This report includes evaluations of 100% of the nation's estuaries in the contiguous 48 states and Puerto Rico. Federal, state, and local agencies collected more than 50,000 samples between 1997 and 2000 for the report, using nationally consistent methods and a probability-based design to assess five key indicators of coastal water health. These indicators included water quality, coastal habitat loss, sediment quality, benthic community condition, and fish tissue contaminants.

The *National Estuary Program Coastal Condition Report* (NEP-CCR) focuses specifically on the condition of the 28 estuaries in the National Estuary Program (NEP) using data collected from 1990–2003 for EPA's National Coastal Assessment. The NEP-CCR also presents recent monitoring data collected and analyzed by each individual NEP for a variety of estuarine quality indicators. The data provided by these NEPs facilitates the development of

State water quality agencies, tribes, and other partners, with support from EPA, conducted the work for the WSA using standardized methods at all sites to ensure the comparability of results across the country. Beyond yielding scientifically credible information on the condition and health of the nation's streams, the WSA was designed to provide states with funding and expertise that enhances their ability to monitor and assess the quality of their waters.

EPA and its collaborating partners plan to conduct similar assessments of other types of waterbodies (e.g., lakes, large rivers, and wetlands) in the future, with the goal of producing updated assessments for each type of waterbody every five years. These repeated studies will ensure that the public remains informed as to whether the collective efforts to protect and restore the nation's waters are meeting with success.